Switzerland's position in the structure of the international system: a sociological analysis

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I.

This analysis is based on the assumption that the structure of the international system decisively co-determines the chances nations have to realize the values of development. The notion of structure, i.e. institutionalized power and prestige, implies a differential distribution of chances, or even a distribution governed by different laws for different regions, as for instance, for the region of the developing countries and for that of the highly developed nations.

The structure of the international system is thus conceived of as representing the distribution of nations' chances to realize the values of development. These chances are assumed to refer to the positions occupied by a nation on the various dimensions of development. Each national configuration of positions has thus certain chances which correspond to it. It is, of course, possible for a nation to make use of its chances to a varying extent, the extent being determined by internal factors independent of the international system. Some of these factors imply a certain amount of autonomy, others do not.

The attempt has been made to represent the structure of the international system by means of a multivariable, non-linear and recursive model which derives the mobility behavior of nations on four development dimensions from those configurations of positions on these development dimensions which are immediately previous to actual behavior. The development dimensions used here are income per capita (I), elementary and secondary education (E), degree of urbanization (U), and the distribution of the economically active population among the three economic sectors - agriculture, industry and services (LD).

The measured mobility behavior refers to the time periods 195o-55, 1955-6o and 196o-65 expressed as functions of the values of the variables I, E, U and LD in 195o or 1955 or 196o, and the products and quotients of pairs of these values.[1)]

The main problem raised by this analysis is whether the model really represents the structure. To solve this problem we must look for relatively stable functions which derive the behavior of a nation from its positions on the four variables as well as from the quotients or products of two variable values. To the extent that such a derivation is possible the recursive association of partial models is assumed to adequately represent the structure. This assumption implies a number of further assumptions: that the structure can be represented by continuous functions, that the behavior of a unit is determined by its immediate environment, and that the selected time period of five years is relevant; further, that the structural chances can be described by position values, comparisons of pairs of positions, and products of two position values, and finally that deviations are determined by independent forces located within the unit, i.e. that the variables selected describe the structure completely.

II.

It is usually assumed without further questioning that Switzerland belongs to the group of highly developed countries. Actually, Switzerland does belong to the group of the most highly developed countries if the level of development is measured by income per capita or, as we do here, by gross domestic product per capita. In the year 196o, for instance, Switzerland ranked fourth after the USA, New Zealand and Canada, and before Sweden, Norway and Australia.

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1) For details see J.Bulnes, B.Gierisch and P.Heintz, Report on the World Model Project, in: Bulletin des Soziologischen Instituts der Universität Zürich, 2o, 2o/I, 2o/II, 1971; P.Heintz, ed. A Macrosociological Theory of Societal Systems, II, Bern 1972.

GDP p.c. 1960

USA	104.00
New Zealand	76.32
Canada	74.78
Switzerland	72.16
Sweden	69.77
Norway	62.37
Australia	61.67

Considering its position on the central development dimension of income p.c., Switzerland may thus be supposed to belong to the region of the most highly developed countries.

As a member of the region of the highly developed countries Switzerland is subject to a number of specific laws derived from the contributions made by some of the additive terms to predicting mobility behavior.

The most important terms for predicting growth of income p.c. are in Switzerland: +E . log I, -I/LD and +I/E. Among the three terms,+I/E has a particularly high weight for the highly developed, and -I/LD for the most highly developed countries.

△ I (absolute increments)

	E . log I	U.LD	I/LD	E/U	I/E
1950-55	7.08	-0.31	-0.43	-0.42	1.55
1955-60	8.30	-0.32	-1.19	-0.45	2.14
1960-65	8.43 ↓	-0.33	-1.85 ↓	-0.46	3.53 ↓

The term -I/LD points to an equilibrating mechanism between I and LD which affects △ I.

The term +I/E points to a disequilibrating mechanism or, more specifically, to economic growth based on a lag of education. This term is opposed to +E . log I which, on the whole, has a high weight for all countries. While in the developing countries

it is education which is the central dynamic factor in economic development, in the highly developed nations the development model characterized by a lead of I over E has a certain validity. There are reasons to assume that this model expresses the idea of a technological lead over the education required to fulfill the job demands, with the exception of a small technological elite . It particularly reflects the development of industrial technology and organization and the superiority of capital intensive production which makes it inadequate for autonomous development of underdeveloped nations.

In the period under consideration the weight of this model even tends to increase. Comparisons with the US and Canada reveal the relative structural chances which result from the term +I/E, due to the positions of these countries within the highly developed region of the international system:

Contribution of the term +I/E to △ I

(see also Annex 1)

Period	Switzerland	USA	Canada
1950-55	1.55	2.74	1.26
1955-60	2.15	4.04	1.26
1960-65	3.53 ↓	4.18 ↓	1.33 ↓

As to the weight of +I/E, Switzerland ranks between the US and Canada. This means that it is not true that the Swiss economy depends, to a particularly high degree, on the educational qualification of its working force.
The weights of the terms of the functions for determining urban growth are the following for Switzerland:

△ U (absolute)

	U/I	log I	E/I	U/E
1950-55	1.35 ↑	-1.12	-0.07	-0.03
1955-60	1.24	-1.26	-0.06	-0.02
1960-65	1.15	-1.37 ↓	-0.05	-0.80

The term U/I is of great importance for practically all countries (analogous to E . log I for △ I). The weight of this term is, however, decreasing in Switzerland during the period considered. The term points to a disequilibrating mechanism, U becoming more central with increasing positive distance from I.

The term -log I has importance only in the most highly developed countries (analogous to -I/LD for △ I). In Switzerland, the weight of this term increases during the period considered. The term can be interpreted in the sense of a decentralization tendency with increasing economic development. This is in accordance with the well-known Swiss pattern of decentralized industrial development.

The weights of the terms of the function for determining growth of LD are the following for Switzerland:

△ LD (absolute)

	I	LD	E/LD	I/LD
1950-55	-1.12 ↑	-0.98 ↓	0.14	0.06
1955-60	-1.02 ↑	-0.94 ↓	0.18	0.27
1960-65	-0.96 ↑	-1.28 ↓	0.15	0.51

The most important terms obviously are -I and -LD. The term -LD is typical of highly developed nations (analogous to +I/E for △ I), and its weight is increasing during the period considered. It can be interpreted in terms of LD becoming a relatively accessible and relevant development value in the highly developed countries. The argument is the same as for E which is relevant and accessible for the whole international system.

The weights of the terms of the function for determining growth of E are the following in Switzerland:

△ E (absolute)

E	E/I	U/LD	I/LD	I.U
-4.14	-o.86 E-19	o.o2	o.86 E-o5	-o.72 E-o3
-4.96	-o.17 E-19	o.o2	o.14 E-o2	-o.5o E-o3
-4.79	-o.14 E-2o	o.o1	o.o1	-o.42 E-o3

The only important term is -E; it is important for practically all countries. Education is for the entire international system a relevant and more or less easily accessible value. Growth depends on the driving force which is supposed to be negatively associated with the educational level obtained.

Among the four partial models concerning the growth of the four development values it is the △ I model which for Switzerland has the best predictive power. In other words, economic development is more strongly oriented toward the chances given by the structure of the international system than the mobility on other development dimensions.

Summarizing we may say that with regard to the terms -I/LD for △ I and -log I for △ U, Switzerland belongs to the region of the most highly developed countries; with regard to the terms +I/E for △ I and -LD for △ LD, the country belongs to the region of the highly developed nations; the terms E.log I for △ I, U/I for △ U and -E for △ E are generally valid, including for Switzerland. The most highly developed countries form a sub-region of the highly developed countries. The specific laws thus refer (a) to a development model with economic (technological) development leading education, (b) to the accessibility and relevance of the development value LD, and (c) to decentralization of the population.

III.

Like other countries Switzerland participates in a particular way in the international system with its regions and sub-regions.

Participation in the structure is based on a configuration of positions on the various development dimensions, a configuration which is changing over time.

We have already said that, with regard to the central economic development value, Switzerland belongs to the group of highest ranking countries (1960:fourth rank). This does not hold for the other development values considered here.

In the year 1960, Switzerland occupied with regard to education one of the lowest ranks among the highly developed nations. The discrepancy between education and income p.c. is particularly striking and has a number of consequences, as will be seen later on. This may be considered as the consequence of a particular historical input and/or as a function of the degree to which Switzerland makes use of the structural with regard to education (see Chapter V.)

Education (1960)

Iceland	84,0
Australia, Canada, USA, Belgium	81,0
New Zealand	80,0
France, Gr.Britain	76,0
Ireland, Netherlands	75,0
Israel, Puerto Rico	74,0
Norway, Japan	73,0
Denmark, BRD	72,0
CSSR	71,0
Sweden, Finland	69,0
Hungary	63,0
Switzerland, Austria	59,0

(The italicized countries are those with the highest income p.c. values in 1960.)

Of the seven countries with the highest income p.c. Switzerland has by far the lowest educational level. This discrepancy is even more impressive if only the four countries with the highest I are considered (USA, New Zealand, Canada and Switzerland). Three of them have very high E-values.

Concerning sectorial differentiation (LD) Switzerland also has a comparatively low rank (rank 14). The three countries ranking highest on I occupy the first, second and fifth rank on the scale of the LD-values. In contrast to education there are, however, a number of highly developed nations having LD-values which are even lower than those of Switzerland: Luxembourg, France, German Federal Republic, Sweden, Austria and Japan (see Annex 2).

As is well-known, urbanization in Switzerland is comparatively low. The high urbanization values of the world sample, however, spread all over the large regions of the international system (see Annex 3). For the nations with the highest degree of urbanization which form a region apart, the term U · LD is affecting Δ I negatively. This term is more or less insignificant for Switzerland. Here, the low U-value again points to a high degree of decentralization of economic activities.

Summarizing we may say that the Swiss configuration of positions is characterized by a high I-value and relatively low values for E, LD and U, but that with regard to the highly developed countries only the low E-value represents a unique deviation (from the pattern of the relationship with I). Another deviation refers to LD, but certainly not to U. Low U-values are characteristic for a group of highly developed nations.

IV.

The positions occupied by Switzerland in the structure of the international system and its regions and outlined in the preceding chapter describe a number of mobility chances. These chances can be assessed by means of the partial derivatives of one variable at a given point in time (for instance 1965) to the same or another variable at another point in time (for instance 1950). The partial derivatives are calculated on the base of the recursive model. In other words,

the positive or negative multiplicator effects indicated by the model which represents the structure, are measured over the selected time period.

The following table shows the structural chances $\frac{\partial I1965}{\partial I1950}$ ranked from below to above:

USA	0,90	Belgium	1,25
New Zealand	1,09	Gr.Britain	1,27
Sweden	1,18	Luxembourg	1,28
Norway	1,22	Netherlands	1,28
Iceland	1,23	BRD	1,29
Australia	1,23	Cyprus	1,30
France	1,24	Finland	1,30
Denmark	1,24	Canada	1,30
South Africa	1,24	Switzerland	1,31

Switzerland occupies the highest rank among the 18 countries with the lowest values. These countries are almost exclusivly highly developed nations which have the lowest values in the total sample. In this regard, Switzerland is located near the group of the developing countries. The same is true for Canada which also has a very high value for I. The difference mentioned above between the highly developed and the developing nations (a difference which also appears within the group of the highly developed countries) is probably due to a certain saturation of the economic development value in the highest regions of the international system, a saturation point which Switzerland in spite of its high I-level has apparently not yet been reached. The saturation of I may be accompanied by a lac of goals or goal anomie which in Switzerland would not be present to the same degree as in other highly developed nations. (For the highest $\frac{\partial I1965}{\partial I1950}$ values see Annex 4 .)

The following table shows the structural chances $\frac{\partial E1965}{\partial E1950}$ of the highly developed countries, ranked from above to below.

Italy	o,62	Sweden	o,52
Spain	o,62	Iceland	o,52
Luxembourg	o,58	Belgium	o,51
Switzerland	o,57	Austria	o,51
Greece	o,57	Gr.Britain	o,51
Israel	o,56	Netherlands	o,51
USA	o,55	Australia	o,49
Finland	o,55	Canada	o,47
USSR	o,54	New Zealand	o,47
France	o,54	Japan	o,45
Norway	o,54	BRD	o,45
Denmark	o,53	Ireland	o,45

The multiplicator of Switzerland is high as compared to the other highly developed countries, higher than for the seven nations with the highest I-values. Thus, the accumulativity of education is relatively high in Switzerland; the same is true for the US.

The following table shows the structural chances $\frac{\partial LD1965}{\partial LD1950}$ of the highly developed countries, ranked from below to above:

Canada	-o,o4	BRD	o,46
USA	o,o9	Luxembourg	o,46
New Zealand	o,1o	France	o,49
Gr.Britain	o,13	Japan	o,59
Australia	o,15	Ireland	o,62
Netherlands	o,19	Austria	o,62
Israel	o,22	Iceland	o,64
Sweden	o,28	USSR	o,72
Switzerland	o,31	Greece	o,73
Denmark	o,32	Finland	o,75
Norway	o,38	Italy	o,78
Belgium	o,4o	Spain	o,8o

The seven countries with the highest I-values have comparatively low partial derivatives for LD. The negative association with economic development level may point to the high accessibility of the LD-values in the highly developed countries,

this in the sense of the above mentioned characteristic of this region (see p.6).

The following table shows the structural chances $\frac{\partial U1965}{\partial U1950}$ of the highly developed countries, ranked from above to below:

Greece	1,29	New Zealand	1,09
USSR	1,18	Switzerland	1,08
Japan	1,17	Spain	1,08
Finland	1,17	Luxembourg	1,08
Belgium	1,16	Canada	1,08
Ireland	1,16	Austria	1,08
France	1,12	Netherlands	1,06
Italy	1,12	USA	1,05
Norway	1,11	Iceland	1,01
Sweden	1,11	Australia	0,94
Denmark	1,09	Gr.Britain	0,94
BRD	1,09	Israel	0,86

There is a low negative association with degree of urbanization, which - with the exception of Japan - points, as in the case of income, to a certain saturation of this development value. In comparison to expectations derived from this association, Switzerland has a comparatively low value.

In summary, it should be noted that for Switzerland the multiplicator of I is comparatively high if compared to the level of I attained.

The analysis of the recursive model shows that the four partial derivatives present characteristic differences for the various nations considered. The central pattern is as follows:

$$\frac{\partial I\ 1965}{\partial I\ 1950} > \frac{\partial U\ 1965}{\partial U\ 1950} > \frac{\partial LD\ 1965}{\partial LD\ 1950} > \frac{\partial E\ 1965}{\partial E\ 1950}$$

The only important exception is that among the most highly developed countries $\frac{\partial E\ 1965}{\partial E\ 1950}$ is higher than $\frac{\partial LD\ 1965}{\partial LD\ 1950}$.

This sequence may be interpreted in the sense that the principle of accumulativity is stronger for I than for U and

stronger for U than for E or LD. The values of the partial derivatives for Switzerland confirm this rule:

$$\frac{\partial I\ 1965}{\partial I\ 1950} = 1{,}31 \quad \frac{\partial U\ 1965}{\partial U\ 1950} = 1{,}08 \quad \frac{\partial E\ 1965}{\partial E\ 1950} = 0{,}57 \quad \frac{\partial LD\ 1965}{\partial LD\ 1950} = 0{,}31$$

For Switzerland, this interpretation finds additional support in the fact that over time the partial derivatives increase when accumulativity is comparatively high, and decrease when it is relatively low:

$$\begin{array}{llll}
\frac{\partial I1955}{\partial I1950} = 1{,}10 & \frac{\partial U1955}{\partial U1950} = 1{,}03 & \frac{\partial E1955}{\partial E1950} = 0{,}84 \uparrow & \frac{\partial LD1955}{\partial LD1950} = 0{,}78 \uparrow \\
\frac{\partial I1960}{\partial I1950} = 1{,}20 & \frac{\partial U1960}{\partial U1950} = 1{,}05 & \frac{\partial E1960}{\partial E1950} = 0{,}70 & \frac{\partial LD1960}{\partial LD1950} = 0{,}53 \\
\frac{\partial I1965}{\partial I1950} = 1{,}31 & \frac{\partial U1965}{\partial U1950} = 1{,}08 & \frac{\partial E1965}{\partial E1950} = 0{,}57 & \frac{\partial LD1965}{\partial LD1950} = 0{,}31 \\
\frac{\partial I1995}{\partial I1950} = 3{,}21 \downarrow & \frac{\partial U1995}{\partial U1950} = 1{,}25 \downarrow & \frac{\partial E1995}{\partial E1950} = 0{,}25 & \frac{\partial LD1995}{\partial LD1950} = 0{,}07
\end{array}$$

Structural chances also result from the relationship between different development values. It is particularly interesting to see in what measure changes in the variables E, U and LD will affect I. Again, the chances are expressed as partial derivatives calculated on the basis of the recursive model. The following table shows the structural chances $\frac{\partial I\ 1965}{\partial E\ 1950}$ of the highly developed countries, ranked from below to above:

USA	0,05	Finland	0,30
Switzerland	0,12	Ireland	0,31
Luxembourg	0,19	Denmark	0,31
Sweden	0,24	France	0,31
Japan	0,24	Belgium	0,31
New Zealand	0,25	Austria	0,32
Canada	0,27	Australia	0,32
Norway	0,28	Gr.Britain	0,33
USSR	0,28	Iceland	0,33
Israel	0,28	Netherlands	0,35
Italy	0,28	BRD	0,35

The economically most highly developed countries have low values in comparison to the other highly developed nations, with the exception of Australia. The instrumentality of E for I is very low in Switzerland. We must add, however, that in the world sample this kind of instrumentality increases on the whole from below to above.

The following table shows the structural chances $\frac{\partial I\ 1965}{\partial U\ 1950}$ of the highly developed countries, ranked from below to above:

Gr.Britain	- 0.56	Norway	- 0.04
Australia	- 0.54	New Zealand	- 0.04
Israel	- 0.45	Canada	- 0.03
Netherlands	- 0.29	Sweden	- 0.01
USA	- 0.24	Italy	- 0.01
BRD	- 0.16	France	0.04
Austria	- 0.13	Ireland	0.06
Denmark	- 0.11	Japan	0.07
Switzerland	- 0.07	USSR	0.07
Luxembourg	- 0.06	Finland	0.13
Iceland	- 0.05	Belgium	0.28

There is a clearly negative association with the degree of urbanization, Switzerland has a lower value than would be expected on the basis of this relationship. This again points to a pattern of decentralized development.

The following table shows the structural chances $\frac{\partial I\ 1965}{\partial LD1950}$ of the highly developed countries, ranked from above to below:

USA	0.45	USSR	- 0.03
New Zealand	0.23	Italy	- 0.05
Sweden	0.21	BRD	- 0.14
Switzerland	0.18	Spain	- 0.15
Luxembourg	0.12	Netherlands	- 0.17
Norway	0.10	Japan	- 0.18
France	0.04	Austria	- 0.23
Belgium	0.03	Canada	- 0.29
Finland	0.02	Iceland	- 0.40
Denmark	0.01	Israel	- 0.45
Greece	- 0.01	Gr.Britain	- 0.58
Ireland	- 0.03	Australia	- 0.65

In Switzerland, the instrumentality of LD for I is relatively high, yet lower than in the US, New Zealand and Sweden. This points to a comparatively high relevance of LD. Comparing the different structural chances of the different development values in Switzerland, the following sequence is obtained:

$$\frac{\partial I1965}{\partial LD195o} = o.18 \quad \frac{\partial I1965}{\partial E195o} = o.12 \quad \frac{\partial U1965}{\partial I195o} = -o.o8 \quad \frac{\partial I1965}{\partial U195o} = -o.o7$$

$$\frac{\partial LD1965}{\partial I195o} = o.o6 \quad \frac{\partial LD1965}{\partial E195o} = o.o1$$

All these partial derivatives increase over time with the exception of the weakest relationship: $\frac{\partial LD\ 1965}{\partial\ E\ 195o}$

$$\frac{\partial I\ 1955}{\partial LD195o} = o.o5 \qquad \frac{\partial I\ 1955}{\partial E\ 195o} = o.o5 \qquad \frac{\partial U\ 1955}{\partial I\ 195o} = -\ o.o3$$

$$\frac{\partial I\ 196o}{\partial LD195o} = o.11 \qquad \frac{\partial I\ 196o}{\partial E\ 195o} = o.o9 \qquad \frac{\partial U\ 196o}{\partial I\ 195o} = -\ o.o6$$

$$\frac{\partial I\ 1965}{\partial LD195o} = o.18 \qquad \frac{\partial I\ 1965}{\partial E\ 195o} = o.12 \qquad \frac{\partial U\ 1965}{\partial I\ 195o} = -o.o8$$

$$\frac{\partial I\ 1995}{\partial LD1995} = o.72 \qquad - \qquad \frac{\partial U\ 1995}{\partial I\ 195o} = -\ o.22$$

$$\frac{\partial I\ 1955}{\partial U\ 195o} = -o.o2 \qquad \frac{\partial LD1955}{\partial I\ 195o} = o.o2$$

$$\frac{\partial I\ 196o}{\partial U\ 195o} = -o.o4 \qquad \frac{\partial LD196o}{\partial I\ 195o} = o.o4$$

$$\frac{\partial I\ 1965}{\partial U\ 195o} = -o.o7 \qquad \frac{\partial LD1965}{\partial I195o} = o.o6$$

$$\frac{\partial I\ 1995}{\partial U\ 195o} = -o.41 \qquad \frac{\partial LD1995}{\partial I\ 195o} = o.29$$

These relationships point to a take-off effect as do $\frac{\partial I\ 1965}{\partial I\ 195o}$ and $\frac{\partial U\ 1965}{\partial U\ 195o}$.

We would like to remind that we are dealing here only with the chances Switzerland is supposed to be offered by the structure of the international system, chances which may not at all or only partly be used.

V.

The question now is to what extent Switzerland is effectively using the structural chances offered, what chances it is using and what chances it is neglecting. A tentative answer is given by the deviations of the values simulated by the recursive model from the real values, i.e. the values corresponding to actual behavior.

	1950	1955		1960		1965	
	real value	simulated/real value		simulated/real value		simulated/real value	
I	53.14	60.62	63.63	69.12	72.16	78.64	84.05
E	55.00	58.98	60.00	62.31	59.00	65.03	50.25
U	20.60	20.74	20.90	20.70	20.30	20.48	19.00
LD	34.40	36.55	34.20	38.31	35.80	39.68	37.20

Simulation tends to underestimate the I-values and to overestimate the values of LD, E and U. This is also reflected by the percentage error of the simulated values for 1965, the simulation being based in this case on the real values of 1950 :

percentage error of: I : - 6.44
E : +29.46
U : + 7.80
LD : + 6.66

First, the enormous overestimation of E is striking. This means that structural chances for developing the educational sector are by far not fully made use of. Conversely, Switzerland, with regard to I, shows a performance that is even better than the one indicated by the structural chances. According to what has been said before, this may be related to the fact that urbanization was actually slower than would have been expected on the basis of the structural chances. Thus, the question arises whether there is something like an internally determined brake

to urbanization.[1] A relatively complex local economic structure in the sense of a historical input may be interpreted as such a brake.

The overestimation of education is particularly noteworthy when keeping in mind that the Swiss configuration of positions is clearly deviant as to its low E-value. It is possible that the same forces are responsible for the lag of E as well as for its overestimation. If in Switzerland the expansion of education were considered merely from the point of view of its contribution to economic development, the low value of $\frac{\partial I1965}{\partial E1950}$ and the high weight of the term +I/E for ΔI would explain a certain restraint in increasing education. The impact of other factors would then be negligeable.

There is a number of other countries where education has been highly overestimated (10% and more) while income p.c. has been underestimated. These countries are the following, ranked according to the overestimation of E:

	% deviations			
	E (10%+)*	I	E(1960)	I (1960)
Switzerland	29.46	- 6.44	59.0	72.16
Pakistan	23.60	- 26.01	20.0	2.94
Austria	20.28	- 7.59	59.0	34.98
Egypt	13.21	- 15.69	35.0	6.67
Japan	12.59	- 19.58	73.0	18.0
Sweden	10.17	- 4.95	69.0	69.77

* see Annex 5 for all deviations

The greatest similarity with respect to the deviations and other variables occurs between Switzerland and Austria:

	Austria	Switzerland
E-%-deviation	20.28	29.46
I-%-deviation	- 7.59	- 6.44
E (1960)	59.0	59.0
$\frac{\partial U\ 1965}{\partial U\ 1950}$	1.08	1.08
$\frac{\partial I\ 1965}{\partial I\ 1950}$	- 0.13	- 0.07

1) J.-P.Hoby and B.Schindler, Centralized and Decentralized Development of National Subunits: Switzerland, in P.Heintz, ed., op.cit.,I.

Concerning the other values, however, there are considerable differences between the two countries.

The question may be raised whether external legitimizing pressures for expanding education are perhaps particularly weak in the small neutral countries of the international upper stratum such as Switzerland, Austria, Finland and Sweden (see Annex 5). Internal factors may,therefore, have a greater weight in these countries. A second reason for the fact that external legitimization pressures are hardly effective in Switzerland may be the federal structure of education. The cantons do not compare with other nations. If this were true other sources of legitimacy might be used by the Swiss governement. At the other extreme, it may be asked whether the large former colonial powers are not perhaps exposed to particularly high legitimization pressures (Great Britain, France, Belgium and Holland).

VI.

In this chapter we will deal with the problem of the future development of Switzerland if the structure of the international system remained unchanged and if Switzerland made full use of the structural chances offered to her. The following simulated I-values for 1980 are based on the real values of 1965:

	I (1960) real value	I (1980) simulated value
USA	104.00	--
New Zealand	76.32	119.88
Canada	74.78	124.58
Switzerland	72.16	118.39
Sweden	69.77	114.64
Norway	62.37	106.60
Australia	61.67	82.92

As can be observed, the rank of Switzerland does not change.

The only radical change in rank positions during the period 196o - 8o occurs in the LD-values. Switzerland moves from rank 14 to rank 4, i.e. her former lag disappears.

LD (198o)

USA	--	Gr.Britain	41.71
Canada	45.86	Australia	41.6o
New Zealand	44.84	Belgium	41.51
Switzerland	44.11	France	41.4o
Sweden	43.97	Netherlands	41.24
Norway	42.66	Luxembourg	4o.9o
BRD	42.12	Israel	4o.71
Denmark	42.o4	Austria	4o.34

On the other hand, the simulation results show that the lag of the Swiss E-values is not made good during the period 196o-8o.

E (198o)

USA	112.68	France	73.5o
Canada	94.63	Netherlands	73.16
Australia	85.99	Norway	71.95
Iceland	85.66	Denmark	7o.92
New Zealand	83.o8	Israel	7o.24
Gr.Britain	82.92	Spain	68.9o
Belgium	8o.3o	Switzerland	68.71
BRD	77.o6	Finland	68.61
Sweden	77.o2	Greece	68.5o
USSR	76.62	Austria	68.23
Japan	75.o4	Luxembourg	65.95
Ireland	74.28	Italy	65.87

Even if structural chances were fully utilized from 1965 onward the Swiss (and Austrian)rank on education would not change up to 198o. This means that the lag does not exclusively depend on the subutilization of structural chances.

Considering these trends we exspect that in the near future the internal rank tensions will mainly be absorbed by way of the expanding tertiary sector (LD). In the most highly developed countries, including Switzerland, this sector will probably be more closely tied to economic development than before (see -I/LD for Δ I).

According to our simulation results, adaptation of the educational level to the economic development level will occur in Switzerland only after 1980.

	I (1980)	E (1980)	I (1985)
Canada	124.58 (1)	94.63 (1)	135.43 (1)
New Zealand	119.88 (2)	83.08 (3)	130.78 (3)
Switzerland	118.39 (3)	68.71 (6)	131.67 (2)
Sweden	114.64 (4)	77.02 (4)	126.10 (4)
Norway	106.60 (5)	71.95 (5)	118.24 (5)
Australia	82.92 (6)	85.99 (2)	88.30 (6)

	E (1985)	I (1990)	E (1990)
Canada	135.45 (1)	150.17 (1)	283.96 (1)
New Zealand	110.81 (2)	142.24 (2)	196.82 (3)
Switzerland	102.92 (3)	142.21 (3)	211.73 (2)
Sweden	91.61 (4)	136.62 (4)	149.83 (4)
Norway	77.42 (6)	129.76 (5)	102.87 (5)
Australia	87.56 (5)	93.83 (6)	88.49 (6)

(It has proved impossible to calculate the values for the US.)

According to our simulation results, Sweden, German Federal Republic and Norway will experience in the tertiary sector a development similar to the Swiss one. Sweden will move from rank 18 1960 to rank 5 1980 (Switzerland from rank 14 to rank 4), Norway from rank 12 to rank 6, and Germany from rank 17 to rank 7 (see Annex 2).

VII.

We have shown at the beginning that Switzerland belongs to the region of the most highly developed countries (as to I, terms - I/LD for △ I and - log I for △ U). However, the weights of two other terms which are typical of the most highly developed countries are low: + I/LD for △LD and + I/LD for △E.

This is true in particular for the second term since the weight of the first one is increasing rapidly between 1950 and 1965 until reaching the value of 0.51. Only in the US and Canada, +I/LD makes a significant and positive contribution to △ E.

Term + I/LD for △ E

	1950-55	1955-60	1960-65
USA	0.22	3.14	2.14
Canada	6.75	0.08	0.94 E -03
New Zealand	0.64 E -04	0.46 E -03	0.30 E -02
Switzerland	0.86 E -05	0.14 E -02	0.01
Sweden	0.13 E -04	0.48 E -03	0.01
Norway	0.58 E -06	0.19 E -04	0.94 E -04
Australia	0.69 E -07	0.24 E -05	0.11 E -04

With the exception of Canada (and the US), the weights increase for all seven top countries in the period considered. The course is very similar for Sweden and Switzerland. In the US, education as well as the tertiary sector follow the development of income p.c.; education appears as a service which is much in demand. This does not hold for the other most highly developed nations, even though the development of Sweden and Switzerland points in the same direction.

Term + I/LD for △ LD

	1950-55	1955-60	1960-65
USA	1.15	2.46	2.21
Canada	3.06	0.87	0.24
New Zealand	0.11	0.20	0.34
Switzerland	0.06	0.27	0.51
Sweden	0.07	0.20	0.48
Norway	0.03	0.08	0.13
Australia	0.02	0.04	0.07

The weights of +I/LD for △LD take the same course as the weights of +I/LD for △E. Probably we are confronted here with one and the same development trend, with education lagging behind and only in the US being adapted to income p.c.

VIII.

In summary, the following should be noted:

The laws, represented by our model, which govern the whole structure of the international system are:

(1) The additive term +E · log I makes an important contribution to the growth of income p.c.

(2) The same is true of the term +U/I with regard to urbanization growth.

(3) Growth of education is decisively determined by the term -E.

Among others, the following regions with their specific laws can be identified in the structure of the international system:

(1) A highly developed region where the term +I/E makes an important contribution to the growth of income p.c., and the term -LD to the growth of the tertiary sector.

(2) Within the highly developed region there is, measured by income p.c., a most highly developed region characterized by important contributions of the term -I/LD to economic growth and of the term -log I to urban growth.

Where is Switzerland located within the structure of the international system?

(1) Swiss income p.c. matches that of the most highly developed countries.
(2) Educational level is low as compared to that of the nations belonging to the highly developed region. In this regard, Switzerland is a uniquely deviant case.
(3) The Swiss level of tertiarization is low as compared to income p.c. This deviation is, however, not typical of Switzerland alone, but is also found in other highly developed nations.
(4) The Swiss level of urbanization is low. However, urbanization is not a criterion of a nation's membership in the highly or most highly developed region for which it seems to be rather irrelevant.

What are Switzerland's structural chances as derived from the model?

(1) The multiplicator of I with regard to I is comparatively high.
(2) The same is true of the multiplicator of E with regard to E.
(3) Instrumentality of E for I is low.
(4) Instrumentality of LD for I is high.

To what degree does Switzerland make use of the structural chances offered to her?

(1) The most striking fact is the very low utilization of structural chances regarding educational growth in the time period 1950-65.
(2) The utilization of structural chances with regard to growth of income p.c. goes a little beyond expectations derived from the structure.

Assuming that the structure of the international system remains unchanged and that Switzerland will make full use of the structural chances offered to her, will she then be able to reduce the lags in education and tertiarization?

Simulation shows that until 1980, the level of tertiarization

will catch up, while the educational lag will disappear only after 1980.

IX.

What is sociologically speaking the meaning of the comparatively low level of secondary education in Switzerland, the primary level being already saturated?
Apparently, this fact has had no effects on economic growth.

Education can be conceived of as a social memory serving for processing information. This memory determines the learning capacity of the population, its possibility to process new information. In this process it is not only the volume of the memory and its internal connections which are of importance, but also its contents, i.e. the specific codes by means of which information is assimilated. In particular, education determines that sphere of reality from which information can be processed.

On the other hand, income p.c. implies, on the individual level, an important access to material and immaterial goods.

A situation as it exists in Switzerland, characterized by low education and high income p.c., can for these reasons easily cause a large number of people to see the world they are - thanks to their income - participating in as rather meaningless, i.e. as not codifiable. It may induce them to react to a "meaningless" situation by making irrational adaptations of withdrawal - attempting to reduce the relevant sphere of reality taken into account by emphasizing personal experience, by advocating narrow-minded localism and nationalism, and by rejecting urban, more open-minded values. Though a large part of the population - as probably in Switzerland - may be addicated to anti-urban values it is hardly conceivable that the same people would accept the consequences of the shrinking of the very complex world-wide interaction field they are involved in. It is in this sense that withdrawal is irrational.
As the world model shows, the multiplicator of I $(\frac{\partial I1965}{\partial I1950})$ is, in Switzerland as well as in Canada, German Federal Republic, Netherlands, Luxembourg and Great Britain, relatively high, especially

compared to the multiplicators of the US, New Zealand, Sweden, Norway, Iceland and Australia. A high multiplicator may be interpreted as indicating a relatively high degree of centrality of the values measured by I and, consequently, a relatively strong resistance against any change of the existing economic structure of the international system. Therefore, we expect less goal anomie or need for new goals in Switzerland than in the second group of nations, on the one hand, but - combined with low education - a higher potential for irrational ethnocentric retreatism on the other.

Irrationalism can adopt two forms which do not necessarily agree with each other - the forms of "back-woods-culture" and "hippy culture". As the perpetuation of a youthful peer culture the latter form is likely to have a considerable chance of survival in an urban environment.

However, we guess that in Switzerland, for the reasons mentioned above, the conservative "Spiesser" has a much better chance than the hippy.

In addition, irrational withdrawal adaptations may cut through the various stratification systems, the system of social classes and, in Switzerland, the intercantonal system stratified according to level of development. In such a situation the oddest short-lived alliances are conceivable due to certain interests the partners have in common. So it is quite possible, for instance, that the rural "back-woods" seek an alliance with the urban lower classes.

The fact that these withdrawal adaptations begin to find a political articulation in Switzerland can no longer be doubted in view of the recent success of the "National Action Party" and similar narrow-minded nationalistic movements. It can easily be predicted that political tensions in Switzerland will be determined to some extent and for quite a while by this type of problems. The reactionary forces may even succeed (as they have probably done in the past) in again delaying the expansion and reorientation of education.

The educational problem becomes even more serious by the presence of a large number of foreign workers. The foreign immigration at the bottom of Swiss society has made it possible

for large sectors of the native population to move up the social ladder thus making the educational insufficiency even worse.[1)]

Education and mass media may provide concepts (codes) but no theory connecting them. The consequence may be an overflooding with information which may lead to ideological reductionism and social prejudice. Therefore, two other forms of irrationalism may be distinguished: one due to the fact that information is rejected, and the other due to overflooding with information or lack of an adequate theory. Both forms may appear simultaneously.

What is sociologically speaking the meaning of the relatively low level of tertiarization in Switzerland?

In the highly developed countries the expansion of the tertiary sector has a number of sociologically relevant aspects:

Industrial production may be characterized by the fact that workers' roles and work organization are determined by technology, and not vice-versa. The learning and innovating capacities of the worker are subused. An increase of the wage level may lead to more capital-intensive technologies the extreme of which is the fully automated industrial plant, or to the relocation of industrial production or the migration of industrial workers both guided by differences in wage levels.
It may also promote new forms of production, i.e. tertiary production. The advantages of the dominating and leading role of technology in industrial production may be compensated by the advantages of making an optimal use of the learning and innovating capacities of the population. The accessibility of this form of production is much more evenly distributed among the nations than the accessibility of industrial production which, in part, depends on the level of development reached. More capital-intensive technologies and the relocation of industrial production may produce structural unemployment. Tertiary production may

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1) H.-J.Hoffmann-Nowotny, Report on a Survey Analysis of Foreign Labor. Part I: Questionnaire Results of Swiss; Part II: Questionnaire Results of Italians. Soziologisches Institut der Universität Zürich, 1971.

compensate structural unemployment caused by more capital-intensive technologies and the relocation of industry. The immigration of industrial workers may prevent the expansion of tertiary production.
The tertiary and industrial forms of production do not coincide completely with the tertiary and secondary sectors. However, the relative increase of the tertiary sector in the most developed nations mainly concerns tertiary production.
Among less developed nations tertiary production represents an alternative to dependent industrial development. The well known anti-status quo effect of education among these nations may be interpreted in this sense.

Industrial production will probably migrate from the most developed countries to less developed ones to a larger extent than has hitherto been the case. Of course, this migration not only depends on the highly developed industrial nations but also on the willingness of the less developed ones to receive foreign industry. Fully automated production will probably continue to be located in the most highly developed nations. The large multi-national corporations will probably be the most important agents for re-location of industrial production in less developed countries. They may, however, continue to absorb part of the highly skilled labor force in the most developed countries.[1)]

It is probable that a massive re-location of production will cause high structural unemployment - particularly in those highly developed countries where, as in Switzerland, the share of the secondary sector is comparatively large - unless at the same time tertiary production as described is expanded. Tertiarization is likely to require a comparatively high educational level of the population, with regard to production as well as consumption. This becomes clear when considering that scientific production is part of the tertiarization process and that it has played, up to now, a particularly important role

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1) P.Heintz, Concentration of Power and Organizational Development Status, in: Bulletin des Soziologischen Instituts der Universität Zürich, 23, 1971, p.33 ff.

in this process of structural change. Tertiarization implies the transition to a new development model - as it already exists in some developing countries - governed by education and science, and consequently the displacement of the old model expressed, as mentioned above, by the term $+I/E \longrightarrow \triangle I$. In developing countries, the unemployed are occasionally absorbed by the inflation of the old tertiary sector (small business, public administration). It is obvious that, with structural unemployment increasing, this same policy may also be applied in highly developed countries. But in this case we would be very far away from the new development model characterized by an optimum utilization of the population's learning and innovating capacities.

As we have seen, Switzerland, economically one of the most highly developed countries, is lagging behind comparable nations with regard to the levels of tertiarization and education. The Swiss solution of the problem outlined has up to now consisted of importing industrial labor from less developed countries; only recently industry has begun to move production abroad. This accounts for the fact that there has hitherto been no structural unemployment. There are two ways of making use of development differences: industrialization of the third world and migration of industrial workers to more developed countries. But in Switzerland, as is well-known, opposition against this last solution is steadily growing, which may lead either to a better integration of foreign labor and/or to its decrease. Curiously enough, opposition against foreign labor is rooted first of all in contexts which have had hardly anything to do with foreign industrial labor. So it has been found, for instance, that in the voting on the second referendum against "Ueberfremdung" (over-foreignization) the yes-votes correlated negatively with the share of foreign workers employed in industry out of the total of industrial labor force. Moreover, opposition against this "foreign" solution is probably reinforced by withdrawal adaptations resulting from lack of adequate education. All this suggests that the old solution will probably not last much longer. However, decrease as well

as integration of foreign labor will necessarily lead to the downward mobility of a great number of Swiss, particularly of those who have been pushed up thanks to the influx of foreign labor. In consequence, tension will move to those contexts which up to now have benefited most from the old solution. It must be assumed, moreover, that a decrease in the number of foreign labor will increase the relevance of class tensions. On the other hand, increased integration of foreign labor may cause those Swiss threatened in their social positions to react by advocating an even more extreme "Helvetism", a reaction that again is favored by the low educational level. If the old solution were given up massive structural unemployment could probably be avoided only by rapid tertiarization. Due, however, to the strong lag of secondary and, above all, higher education, the Swiss context is not favorable to rapid tertiarization.

On the other hand, our partial Δ LD-model does not indicate an instrumentality of E for LD:

Term +E/LD for Δ LD

	1950-55	1955-60	1960-65
USA	0.25	0.24	0.22
Canada	0.66	0.42	0.26
New Zealand	0.25	0.28	0.26
Switzerland	0.14	0.18	0.15
Sweden	0.22	0.30	0.25
Norway	0.22	0.27	0.25
Australia	0.22	0.27	0.28

The highest contributions of this term can be found in some underdeveloped nations. According to the partial derivatives $\frac{\partial LD\ 1965}{\partial E\ 1950}$ of the world model, E has practically no effect on LD. From the point of view of Switzerland's position in the international system we may say that, due to the massive immigration of foreign labor, an economically successful Switzerland has neglected to look for a solution of the problems of education

and tertiarization; in the meantime an enormous potential demand in both fields is building up which, the longer it lasts, the more difficult it will be to cope with it.

X.

Anticipated or real structural unemployment but not irrational retreatism may stimulate a restructuring of the economy for which the national actor is made responsible. This restructuring may be seen as a task of the education and science policy by creating the basic conditions for a development model governed by education and science. At the same time such a policy would provide a better code for understanding the world.

Modern society may be characterized as a highly complex interaction field of nations, regions, organizations and individuals. In the eyes of the individual actor, extension, complexity and dynamics of social reality have,in the recent past, been increasing at an ever more rapid pace. This continously changing social reality which is relevant for the individual actor determines the frame of reference for the rationality of his actions. Or the same problem stated differently: The individual actor is exposed to an increasing amount of heterogeneous information which he codifies with the help of the contents of his memory. In order to do this adequately he needs more and more complex and abstract conceptual systems, since only by means of such systems can he hope to process the huge amount of relevant information. He needs, moreover, a constant feedback of the results of the processing into the conceptual system itself in order to continuously adapt this system to new information. Such a system is called learning capacity. Learning capacity thus involves functions of perception, memory, logical transformation, theory construction and emission of information. The higher the learning capacity of an actor, the better he is able to adequately handle the social reality which is relevant for him. We can also say that learning capacity depends (1) on the theories which are available to the actor, (2) on the quality

of the codification of information in terms of his theories, (3) on the quality of the logical operations he performs and (4) on whether he revises his theories on the basis of new information.

In addition it has to be taken into account that the contents of learning are not subject to the so-called zero-sum game, i.e. the gain of one actor is not made at the expense of another. In other words, knowledge has other properties than economic goods.This means that knowledge is not accumulated and used for power purposes in the same way as economic goods, and that it is not only the actor having a lot of knowledge who can give away part of it with the aim of acquiring more for himself. The production of knowledge is not based on unequal distribution; it is rather so that knowledge constitutes a realm which is relatively free of domination. The exchange of knowledge has no interest rates. But knowledge is a source of prestige; it is a source of gifts. It may even be affirmed that scientific production is the more efficient, the lower the unequality of distribution, since the exchange of knowledge is maximized under conditions of equality. The more knowledge is exchanged the higher is the level of knowledge. The same cannot be said about the exchange of economic goods.

It follows from these two points of view that an educational institution conceived of as a learning process in the sense outlined above pursues two main goals: maximization and democratization of learning capacity. Maximization implies the creation of a system whose memory structure conforms to an internally consistent theory integrated by concepts able to assimilate a maximum amount and a maximum diversity of information, and operating at a maximum speed and precision. Democratization of learning capacity means its equalization among comparable actors. At the same time, it implies maximization of <u>diversity</u> in the contents of the actors' memories. In this way, not only learning capacity but also the potential exchange of knowledge is maximized. Diversification of memories is one of the basic conditions for maximizing the innovating capacity of the system. Innovation requires a partial overlapping of

interacting memories or of the theories the memories are based on.

The few considerations presented here, concerning an educational institution conceived of as an instrument for maximizing the learning and innovating capacities, show that there is an enormous gap between the educational system as a social institution of modern societies and the goals mentioned before as well as the means for reaching them; that our educational system is not mainly oriented toward these goals and, thus, is not an expression of a theory conforming to these goals, but that it describes and interprets the social situation - implicitly and explicitly - in a very different way. An exception are the sciences, mainly the natural sciences.

In what follows a few differences between education as a social institution and education as increasing the learning and innovating capacities are stated:

(1) As a rule, the educational institution has no feedback mechanism which would subject knowledge to a constant revision. As is well-known, the change of educational contents is extremely slow.

(2) As a differentiated social sector, the educational institution does not continuously assimilate current information and re-interpret it by means of new theories. There is only one activity that is continously practiced: logical transformations in the sense of symbolic manipulations.

(3) Knowledge is distributed by the educational institution in a way which favors the emergence of controlled mobility channels within the educational sector. Part of the knowledge which is valid on one level is not valid on another.

(4) The memories built into the educational institution are ranked hierarchically and correspond at the same time to a division of labor; thus, a maximum effect in favor of the status quo is obtained. This clearly contradicts the principle of democratization of learning capacities.

Re-orienting the educational institution in the sense outlined

above would have - among others - the following consequences:

(1) The educational institution itself would keep learning up to date.

(2) Independence of the educational institution would be guaranteed so that it could reach its aims as far as possible.

(3) Participation in the educational institution would be largely independent of age.

(4) The stratification of educational contents would be diminished and, as a consequence, scientific results which under the old circumstances are concentrated at certain places, would diffuse more effectively and more rapidly.

(5) The educational institution would not concentrate exclusively on the training of symbolic manipulations but equally so on the codification of new information, on the revision of theories used in organizing information, and on the emission of newly acquired knowledge.

(6) The distance between memories (for example disciplines) would be reduced in such a way that interaction between them would maximize innovation.

(7) Learning and innovating capacities would be objects of continous and extensive basic research.

XI.

Our consideration concerning the position of Switzerland in the international system and the consequences expected for the future can be summarized as follows:

(1) The striking lag of education has had no consequences up to now for the economic development of Switzerland.

(2) The failure to make use of structural educational chances is reflected in an educational policy which considers education as instrumental only to the economy but not to orientation in the larger world.

(3) The general trend of utilizing development differences is, in Switzerland, clearly reflected by the large influx

of foreign labor at the bottom of the society and not so much by a shift of industrial production to less developed countries.

(4) The trend to make use of development differences through importing labor is politically opposed by those sectors of the Swiss population who have hardly participated in the corresponding economic growth.

(5) The low educational level, together with a very high level of economic development is favorable to irrational withdrawal adaptations.

(6) These withdrawal adaptations reinforce not only the opposition against the policy of importing foreign labor but also the neo-feudal discrimination against the foreigners.

(7) If successful the opposition could lead to a decrease in the amount of foreign labor and/or an increased integration of foreigners.

(8) A diminishing number of foreign workers would lead to downward mobility of those Swiss who moved up thanks to the immigration of foreigners as well as to a stronger shift of industrial production to less developed countries.

(9) Downward mobility of certain groups of Swiss would lead to higher tensions between social classes.

(1o) The re-location of industrial production could result in structural unemployment which might be rather high in view of the low share of persons employed by the tertiary sector.

(11) The postulated buildup of tertiary production in order to compensate structural unemployment caused by the re-location of industry, depends on a comparatively high level of education and on a corresponding re-orientation of the educational institution, as has been outlined in chapter X.

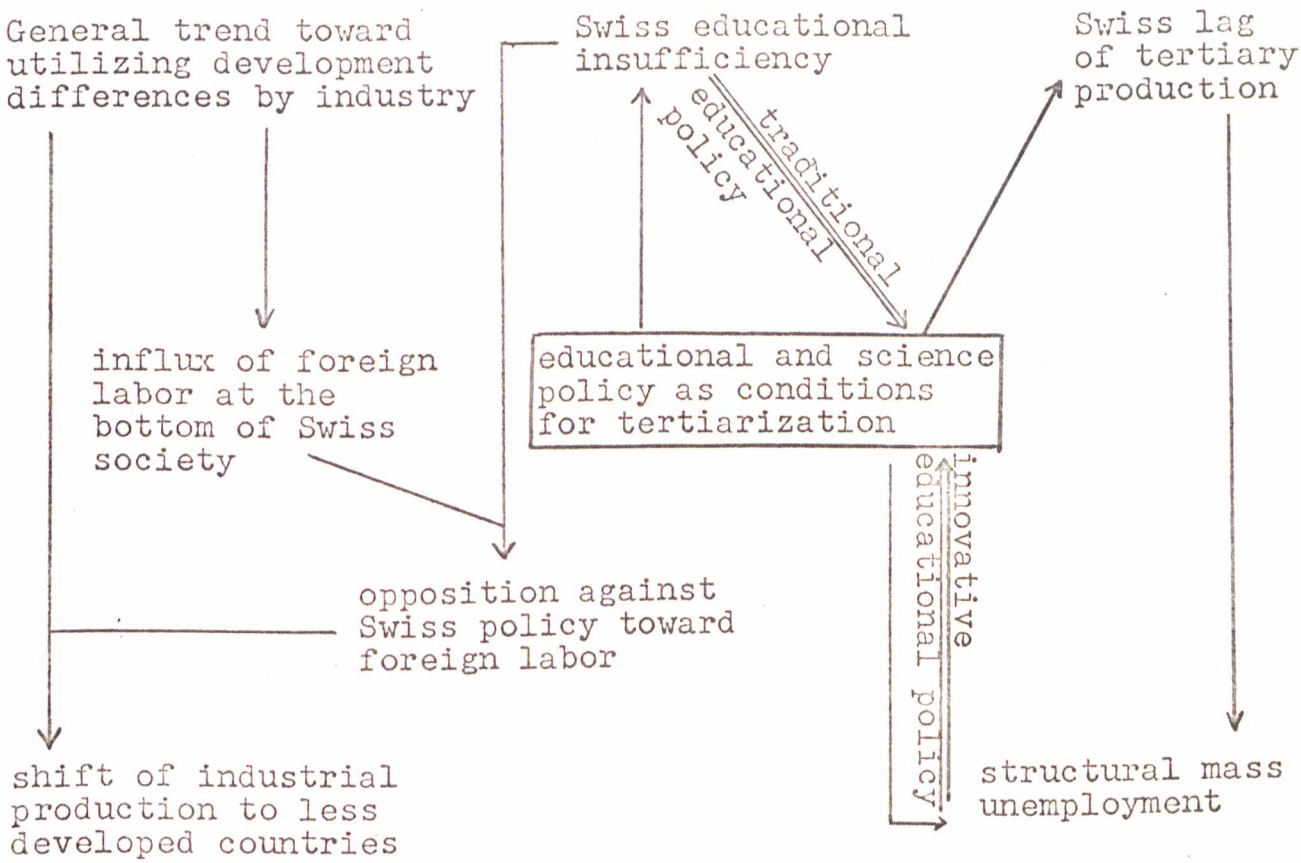
(12) The irrational withdrawal adaptations with their anti-cosmopolitan character could turn out to be formidable political obstacles to the growth and re-orientation of the educational and scientific institutions, and, as a consequence, to the buildup of tertiary production and the compensation of structural unemployment as well. In short, they could prevent the transition toward a development model governed by

education and science.[1)]

(13) The diffusion of this development model implies an increased equality of chances among nations. Up to now, Switzerland has hardly participated in this change of the international system.

XII.

The field of education and science policy forces in Switzerland



The postulated education and science policy is the policy designated as innovative.

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1) The best known historical example of this kind of withdrawal adaptations is German National Socialism which tried to absorb structural unemployment by rearmament and economic self-sufficiency.

Today, the skills required of industrial workers - skills determined by technology - are available almost everywhere in the world or at least can be easily taught. If this type of technology remains unchanged the location of production will increasingly be determined by wage levels.

This and a trend toward equalization of education on the secondary level and the increasing power of multinational coporations are the basis for predicting the industralization of the third world. Only automation can provide a certain independence of wage levels to industrial production.

In the highly developed countries, the re-location of industrial production and the expansion of automation are likely to cause structural unemployment. Apart from the fact that unemployment in the sense of a normative deficit is favorable to political irrationalism, there are two basic options:

(a) Revenue is distributed among the unemployed population, paid for out of automated production, and

(b) new labor-intensive forms of production which are relatively independent of wage levels are created.

The second option is a challenge to innovation, requiring the creation of a new type of tertiary sector. The following considerations are pertinent here: Human learning and innovation capacities on the individual, organizational and societal levels are hardly put to use by industrial production. The new tertiary production, on the other hand, would attempt to make full use of these capacities. It would thus presuppose, and be based on, the modern revolution in education and science, with regard to quantity as well as to quality.

With regard to the consequences for the international system the following points have to be kept in mind:

(a) The larger the shift of industrial production to under-

developed countries, the faster tertiary production will grow in the highly developed countries.

(b) The stronger the development of tertiary production in the underdeveloped countries, the smaller will be the shift of industrial production to these countries and the more rapid will be the expansion of automation in the highly developed countries.

The higher the degree of automation, the higher will be structural unemployment in the most developed countries and the more they will tend to expand tertiary production.

Since in Switzerland the dominating factor of educational conditions is unfavorable not only structural unemployment but also a decrease in wage levels - in order to keep industrial production in the country - are to be expected.

The educational and science revolution whose extreme would be a development model governed by education and sciene is less likely to occur in the developed countries than in the underdeveloped ones since the model of the technological level is well institutionalized there. Switzerland is no exception to this.

Annex 1

Term +I/E --> ΔI

	1950-55		1955-60		1960-65
Australia	0.47	→	0.58	→	0.68
Belgium	0.19	→	0.25	→	0.26
Canada	1.26		1.26	→	1.33
Denmark	0.47	←	0.39	→	0.73
France	0.31	→	0.36	→	0.51
Guatemala	0.22	←	0.11	←	0.09
Honduras	0.11	←	0.02	←	0.01
Iceland	0.17	→	0.20	←	0.12
Luxemburg	1.07	→	1.99	→	2.50
Netherlands	0.18	→	0.28	→	0.42
New Zealand	0.36	→	1.09	→	1.49
Norway	0.64	→	0.76	→	1.01
South Africa	0.12	→	0.14	←	0.08
Sweden	0.53	→	1.00	→	1.82
Switzerland	1.55	→	2.15	→	3.53
Great Britain	0.38	→	0.39	→	0.57
USA	2.74	→	4.04	→	4.18
Hungary	0.20	←	0.13	←	0.07

(The values of the hihgly developed countries increase with great regularity).

Annex 2

	LD 1960		LD 1980	
USA	42.80	(1)	-	
Canada	40.80	(2)	45.86	(2)
Israel	40.80	(3)	40.71	(9)
Uruguay	40.60	(4)	39.97	(16)
New Zealand	39.90	(5)	44.84	(3)
Great Britain	39.90	(6)	41.71	(10)
Australia	39.50	(7)	41.60	(11)
Netherlands	39.00	(8)	41.24	(14)
Puerto Rico	38.80	(9)	40.88	(16)
Denmark	37.60	(10)	42.04	(8)
Belgium	37.20	(11)	41.51	(12)
Norway	37.00	(12)	42.66	(6)
Argentina	36.20	(13)	39.26	(15)
Switzerland	35.80	(14)	44.11	(4)
Luxemburg	35.70	(15)	40.50	(15)
France	34.90	(16)	41.40	(13)
Germany Fed. Rep.	34.80	(17)	42.12	(7)
Sweden	34.30	(18)	43.97	(5)
Austria	32.00	(19)	40.34	(17)
Japan	31.50	(20)	38.87	(20)

Annex 3

U (1960)

Australia	58.70
Great Britain	49.20
Argentina	41.40
Iceland	40.70
Japan	40.50
Uruguay	39.70
Israel	34.70
Germany Fed. Rep.	33.70
Netherlands	32.80
Austria	32.10
Colombia	30.30
Spain	28.00
Syria	27.40
USA	27.30
Venezuela	27.00
Egypt	26.40
Italy	24.20
Canada	24.00
Korea Rep.	24.00
USSR	24.00
Denmark	23.30
Puerto Rico	23.10
Hungary	23.00
Luxemburg	22.50
Germany DDR	21.30
Ireland	21.10
Switzerland	20.30

Annex 4

The following countries have the largest $\frac{\delta I\ 1965}{\delta I\ 1950}$ values:

Philippines	8.097
Yugoslavia	4.668
Ceylon	2.846
India	2.014
Paraguay	1.935
Japan	1.820
Congo	1.721
Greece	1.705
Pakistan	1.689
Peru	1.602
Ecuador	1.579
Egypt	1.571
Brazil	1.565

Annex 5

%E -deviations in 1965

Cyprus	58.53	Germany Fed. Rep.	1.64
Switzerland	25.46	Spain	0.99
Guatemala	28.53	New Zealand	-0.36
Pakistan	23.60	Peru	-1.35
Austria	20.28	Portugal	-1.79
Egypt	13.21	France	-2.93
Luxemburg	13.14	Honduras	-2.57
Japan	12.95	Chile	-2.98
Nicaragua	12.11	Ceylon	-5.23
Germany DDR	11.56	CSSR	-6.56
Finland	10.33	Colombia	-6.60
Sweden	10.17	Canada	-6.62
Hungary	7.98	Congo	-6.71
Israel	7.95	Philippines	-7.76
Ireland	7.94	Brazil	-9.03
Turkey	7.66	Mexico	-9.24
Greece	7.52	USSR	-10.87
Paraguay	7.07	Great Britain	-13.75
Italy	6.84	South Africa	-13.88
Denmark	6.51	Belgium	-16.84
USA	6.25	Puerto Rico	-16.86
Argentina	5.73	Bulgaria	-17.23
Uruguay	4.97	India	-20.28
Netherlands	3.36	Venezuela	-20.30
Norway	3.27	Iceland	-20.33
Ecuador	2.52	Yugoslavia	-21.57
Australia	2.31		